

We claim:

1. A process for preparing catalyst systems of the Ziegler-Natta type, which comprises the following steps:
 - A) bringing an inorganic metal oxide into contact with a tetravalent titanium compound and
 - B) bringing the intermediate obtained from step A) into contact with a magnesium compound $\text{MgR}^1_n\text{X}^1_{2-n}$, where X^1 are each, independently of one another, fluorine, chlorine, bromine, iodine, hydrogen, NR^x_2 , OR^x , SR^x , SO_3R^x or OC(O)R^x , and R^1 and R^x are each, independently of one another, a linear, branched or cyclic C_1 - C_{20} -alkyl, a C_2 - C_{10} -alkenyl, an alkylaryl having 1-10 carbon atoms in the alkyl part and 6-20 carbon atoms in the aryl part or a C_6 - C_{18} -aryl and n is 1 or 2,
 - C) bringing the intermediate obtained from step B) into contact with a halogenating reagent of the formula $\text{R}^y_s\text{-E-Y}_{4-s}$, where R^y are each, independently of one another, hydrogen, a linear, branched or cyclic C_1 - C_{20} -alkyl, a C_2 - C_{10} -alkenyl, an alkylaryl having 1-10 carbon atoms in the alkyl part and 6-20 carbon atoms in the aryl part or a C_6 - C_{18} -aryl, E is carbon or silicon, Y is fluorine, chlorine, bromine or iodine and s is 0, 1, 2 or 3 when E is carbon and s is 1, 2 or 3 when E is silicon.
2. A process for preparing catalyst systems as claimed in claim 1, wherein a magnesium compound MgR^1_2 is used in step B).
3. A process for preparing catalyst systems as claimed in claim 1 or 2, wherein the halogenating reagent used in step C) is chloroform.
4. A process for preparing catalyst systems as claimed in any of claims 1 to 3, wherein the inorganic metal oxide used in step A) is a silica gel.
5. A process for preparing catalyst systems as claimed in any of claims 1 to 4, wherein the tetravalent titanium compound used in step A) is titanium tetrachloride.
6. A process for preparing catalyst systems as claimed in any of claims 1 to 5, which comprises the following steps:
 - A) bringing an inorganic metal oxide into contact with a tetravalent titanium compound and

- 5 B) bringing the intermediate obtained from step A) into contact with a magnesium compound $\text{MgR}^1_n\text{X}^{1}_{2-n}$, where X^1 are each, independently of one another, fluorine, chlorine, bromine, iodine, hydrogen, NR^{X}_2 , OR^{X} , SR^{X} , $\text{SO}_3\text{R}^{\text{X}}$ or OC(O)R^{X} , and R^1 and R^{X} are each, independently of one another, a linear, branched or cyclic C_1 - C_{20} -alkyl, a C_2 - C_{10} -alkenyl, an alkylaryl having 1-10 carbon atoms in the alkyl part and 6-20 carbon atoms in the aryl part or a C_6 - C_{18} -aryl and n is 1 or 2,
- 10 C) bringing the intermediate obtained from step B) into contact with a halogenating reagent of the formula $\text{R}^{\text{Y}}_s\text{-E-Y}_{4-s}$, where R^{Y} are each, independently of one another, hydrogen, a linear, branched or cyclic C_1 - C_{20} -alkyl, a C_2 - C_{10} -alkenyl, an alkylaryl having 1-10 carbon atoms in the alkyl part and 6-20 carbon atoms in the aryl part or a C_6 - C_{18} -aryl, E is carbon or silicon, Y is fluorine, chlorine, bromine or iodine and s is 0, 1, 2 or 3 when E is carbon and s is 1, 2 or 3 when E is silicon, and
- 15 D) optionally bringing the intermediate obtained from step C) into contact with a donor compound.
- 20 7. A process for preparing catalyst systems as claimed in claim 6, wherein the donor compound used in step D) contains at least one nitrogen atom.
8. A catalyst system of the Ziegler-Natta type which can be prepared by a process as claimed in any of claims 1 to 7.
- 25 9. A prepolymerized catalyst system comprising a catalyst system as claimed in claim 7 and linear C_2 - C_{10} -1-alkenes polymerized onto it in a mass ratio of from 1:0.1 to 1:200.
- 30 10. A process for the polymerization or copolymerization of olefins at from 20 to 150°C and pressures of from 1 to 100 bar in the presence of at least one catalyst system as claimed in claim 8 or 9 and, if appropriate, an aluminum compound as cocatalyst.
11. A process for the polymerization or copolymerization of olefins as claimed in claim 10, wherein a trialkylaluminum compound whose alkyl groups each have from 1 to 15 carbon atoms is used as aluminum compound.
- 35 12. A process for the polymerization or copolymerization of olefins as claimed in claim 10 or 11, wherein ethylene or a mixture of ethylene and C_3 - C_8 - α -monoolefins is (co)polymerized.
- 40 13. The use of a catalyst system as claimed in claim 8 or 9 for the polymerization or copolymerization of olefins.